

We claim:

1. In a vacuum microtube device comprising a silicon substrate, a cathode comprising electron emitters secured to the substrate, an anode secured to the substrate and a gate between the cathode and the anode secured to the substrate to induce electron emission from the cathode to the anode, the improvement wherein:

the spacing between the grid and the cathode is tunable.

2. The improved device of claim 1 wherein the gate is secured to the substrate by a resilient element and the spacing between the grid and the cathode is tunable by stretching or compressing the resilient element.

3. The improved device of claim 2 further comprising an electrostatic or magnetic actuator secured to the substrate for stretching or compressing the resilient element.

4. The improved device of claim 1 wherein the gate is secured to the substrate by a rail member and the spacing between the gate and the cathode is tunable by sliding the gate on the rail member.

5. The improved device of claim 4 further comprising an electrostatic or magnetic actuator secured to the substrate for sliding the gate on the rail member.

6. The improved device of claim 1 further comprising a feedback circuit responsive to the current received by the anode and an actuator, responsive to the feedback circuit, for tuning the spacing between the gate and the cathode.

7. In a process for fabricating a vacuum microtube device comprising a silicon substrate, a cathode including electron emitters attached to the substrate, comprising electron emitters an anode attached to the substrate, and a gate secured to the substrate between the cathode and the anode, the process comprising the step of attaching at least one of the cathode, anode or gate to the substrate by a flexural member and stacking a magnetic component to the flexural member for changing the position of the cathode, anode or grid, respectively the improvement wherein:

the flexural member comprises a magnetic component for permitting change of position by an external magnetic field.

8. The improved process of claim 7 further comprising a locking arrangement for locking the cathode, anode or gate in position when the flexural member flexes by a sufficient amount.

9. The improved process of claim 1 wherein the substrate comprises a plurality of cathodes, anodes and gates arranged as an array of microtubes